The Marshall Star

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Manager of Public and Employee Communications: June E. Malone
Editor: Jenalane Rowe

All-Hands Meeting with Marshall Center Director Scheuermann, Viewing of NASA Administrator Bolden Address set for Feb. 2

By Kenneth Kesner

Marshall Space Flight Center employees are encouraged to come watch NASA Administrator Charles Bolden's televised "Reach for New Heights" address and participate in an all-hands meeting with Marshall Director Patrick Scheuermann and Deputy Director Teresa Vanhooser beginning at 12:30 p.m. Feb. 2 in the Activities Building 4315.

Scheuermann and Vanhooser will reflect on Marshall's achievements of 2014 and look forward to exciting events in 2015 that will advance space science and exploration and enable NASA's journey to Mars. They will also talk about NASA's fiscal year 2016 budget proposal and how it affects Marshall.

The all-hands will begin about 1:15 p.m., following Bolden's address set for 12:30 p.m. from Kennedy Space

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Marshall Team Members Invited to Annual 'Day of Remembrance' Jan. 29

On Jan. 29, NASA's Marshall Space Flight Center will hold a ceremony honoring members of the NASA family who have lost their lives in the quest of space exploration. The ceremony will pay tribute to the crews of Apollo 1 and space shuttles Challenger and Columbia, as well as other NASA colleagues.

Team members are invited to join Marshall Center Director Patrick Scheuermann and retired astronaut Robert "Hoot" Gibson and for the ceremony in the lobby of Building 4200 at 9 a.m.

Space Launch System Booster Aimed and Ready to Fire

By Megan Davidson

A full-scale version of the booster for NASA's new rocket, the Space Launch System, is ready to fire for a major ground test that is paving the way on NASA's journey to Mars.

When completed, two five-segment boosters and four RS-25 engines will power the SLS to orbit and enable astronauts to explore destinations in deep space, including an asteroid and the Red Planet.

The two-minute, full-duration static test -- scheduled for March 11 at booster prime contractor ATK's test facility in Promontory, Utah -- is a significant milestone for the program and will qualify the booster design for high temperature conditions. This type of test typically only comes after multiple years of development and signifies major progress being made on the rocket. Once this test and a second, low-temperature test planned for early 2016 are complete, the hardware is qualified and ready for the first flight of SLS.

"With RS-25 engine testing underway, and this qualification booster firing coming up, we are taking big steps toward building this rocket and fulfilling NASA's mission of Mars and beyond," said SLS Program Manager Todd May. "This is the most advanced propulsion system ever built and will power this rocket to places we've never reached in the history of human spaceflight."

Some 103 design objectives will be measured through more than 534 instrumentation channels on the booster. It will be heated to 90 degrees Fahrenheit to measure solid rocket booster performance at high temperatures, as well as to demonstrate that it meets applicable structural and ballistic requirements.

The first qualification motor for NASA's Space Launch System's booster is installed in ATK's test stand in Utah and is ready for a March 11 static-fire test. (ATK)

Other objectives include data gathering on vital motor upgrades, such as the new insulation and booster case liner and the redesigned nozzle, which increases the robustness of the design. "The improvements we've made to the SLS boosters, like new insulation materials, will make them more environmentally friendly, safe and affordable," said Bruce Tiller, deputy manager of the SLS Boosters Office at NASA's Marshall Space Flight Center. Marshall manages the SLS Program for the agency.

So, What's a Booster?

Solid rocket boosters operate in parallel with the main engines for the first two minutes of flight to provide the thrust needed for the launch vehicle to escape the gravitational pull of Earth.

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All-Hands *Continued from page 1*

Center. Kennedy Director Bob Cabana will join Bolden for the address.

Marshall employees who cannot attend will be able to watch both the Bolden address and the all-hands meeting with Scheuermann and Vanhooser live on Desktop TV. The Bolden address will also be carried live on NASA TV.

Questions will be taken from the audience at the all-hands and can be submitted anonymously from notecards available at the entrance.

Kesner, an ASRC Federal/Analytical Services employee, supports the Office of Strategic Analysis & Communications.

NASA Spinoff 2015 Features Space Technology Making Life Better on Earth

NASA technologies are being used to locate underground water in some of the driest places on the Earth, build quieter and more fuel-efficient airplanes, and create shock absorbers that brace buildings in earthquakes.

The 2015 edition of NASA's annual Spinoff publication highlights these and other technologies whose origins lie in space exploration, but now have broader applications.

"The game-changing technologies NASA develops to push the envelope of space exploration also improve our everyday lives," said NASA Chief Technologist David Miller. "Spinoff 2015 is filled with stories that show there is more space in our lives than we think."

Spinoff 2015 tells the story of shock absorbers used during space shuttle launches that are now being used to brace buildings during earthquakes, preventing damage and saving lives. The book also features a NASA-simplified coliform bacteria test that is being used to monitor water quality in rural communities around the world, as well as cabin pressure monitors that alert pilots when oxygen levels are approaching dangerously low levels in their aircraft.

Published every year since 1976, Spinoff offers a close-up look at how NASA's initiatives in aeronautics and space exploration have resulted in technologies with commercial and societal benefits across the economy, in areas such as health and medicine, transportation,

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SLS Booster

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The SLS boosters will be used for the first two, 70-metric-ton flights of the SLS. One SLS booster is approximately 177 feet long, 12 feet in diameter and weighs 801 tons. Each booster produces 3.6 million pounds of thrust.

The boosters also will have an avionics system made up of hardware, software and operating systems that will communicate with the SLS avionics system and ground operations. The avionics also will control booster operations, like motor firing and nozzle steering.

Proven hardware from the space shuttle era will be used for the SLS boosters, but modified for SLS requirements. While the shuttle used two, four-segment boosters, SLS will be powered by two, five-segment boosters. The added booster segment contains more solid propellant that allows SLS to lift more weight and reach a higher altitude before the boosters separate from the core stage. The core stage, towering more than 200 feet tall with a diameter of 27.6 feet, will store cryogenic liquid hydrogen and liquid oxygen that will feed the vehicle's RS-25 engines.

Booster hardware and software is developed, built and tested by prime contractor ATK. NASA and ATK have successfully completed three, full-scale development test firings of the five-segment booster ahead of the upcoming qualification test.

"What's impressive about this test is when ignited, the booster will be operating at about 3.6 million pounds of thrust, or 22 million horsepower," said Alex Priskos, manager of the SLS Boosters Office at Marshall. "This test firing is critical to enable validation of our design."

Davidson, an ASRC Federal/Analytical Services employee, supports the Office of Strategic Analysis & Communications.

NASA's Chandra Detects Record-Breaking Outburst from Milky Way's Black Hole

Astronomers have observed the largest X-ray flare ever detected from the supermassive black hole at the center of the Milky Way galaxy. This event, detected by NASA's Chandra X-ray Observatory, raises questions about the behavior of this giant black hole and its surrounding environment.

The supermassive black hole at the center of our galaxy, called Sagittarius A*, or Sgr A*, is estimated to contain about 4.5 million times the mass of our sun.

Astronomers made the unexpected discovery while using Chandra to observe how Sgr A* would react to a nearby cloud of gas known as G2.

On Sept. 14, 2013, Haggard and her team detected an X-ray flare from Sgr A* 400 times brighter than its usual, quiet state. This "megaflare" was nearly three

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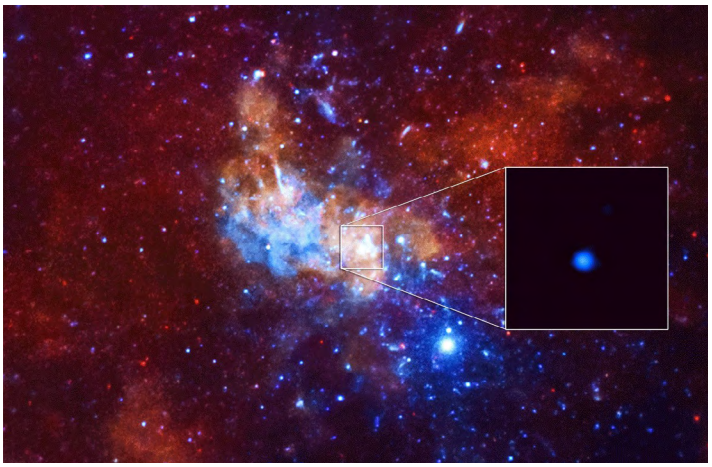

Astronomers have detected the largest X-ray flare ever from the supermassive black hole at the center of the Milky Way using NASA's Chandra X-ray Observatory. This event was 400 times brighter than the usual X-ray output from the black hole. (NASA/CXC/Stanford/I. Zhuravleva et al.)

NASA Spinoff

Continued from page 3

public safety, consumer goods, energy and environment, information technology, and industrial productivity. These spinoffs contribute to the country's economic growth by generating billions of dollars in revenue and creating thousands of jobs.

"NASA enjoys a large and varied technology portfolio unlike any other in existence," said Daniel Lockney, NASA's Technology Transfer program executive. "And the range of successful technology transfer documented in Spinoff each year is as diverse as NASA's many science and exploration missions."

The publication also includes a "Spinoffs of Tomorrow" section showcasing 20 industry-ready NASA technologies -- from smart coatings that protect metal from corrosion to an identity verification system that uses the human heartbeat as a "fingerprint" -- that are all available for licensing.

"Spinoff 2015 is packed with great examples of NASA technologies being re-purposed for new and improved commercial products that create new jobs, save lives, and improve life on Earth," said Terry Taylor, manager of the Marshall Technology Transfer Office. "Marshall has five technologies mentioned in Spinoff this year -- an indication of the importance of technology and innovation at the center."

NASA's Technology Transfer Program is charged with finding the widest possible applications of agency technology. Through partnerships and licensing agreements with industry, the program ensures NASA's investments in pioneering research find secondary applications that benefit the economy, create jobs and improve quality of life.

Print copies of Spinoff 2015 are available in the Marshall Public Inquiry Office in Building 4200, Room 120, or can be requested free of cost on the Spinoff website, where digital versions of the book also can be downloaded. An iPad version of Spinoff 2015, including multimedia and interactive features, is also available for download in the Apple iTunes store.

Spinoff 2015 is available online here.

For more information about NASA's Technology Transfer Program, visit here.

Chandra *Continued from page 4*

times brighter than the previous brightest X-ray flare from Sgr A* in early 2012. After Sgr A* settled down, Chandra observed another enormous X-ray flare 200 times brighter than usual on Oct. 20, 2014.

Astronomers estimate that G2 was closest to the black hole in the spring of 2014, 15 billion miles away. The Chandra flare observed in September 2013 was about a hundred times closer to the black hole, making the event unlikely related to G2.

The researchers have two main theories about what caused Sgr A* to erupt in this extreme way. The first is that an asteroid came too close to the supermassive black hole and was torn apart by gravity. The debris from such a tidal disruption became very hot and produced X-rays before disappearing forever across the black hole's point of no return, or event horizon.

If this theory holds up, it means astronomers may have found evidence for the largest asteroid to produce an observed X-ray flare after being torn apart by Sgr A*.

A second theory is that the magnetic field lines within the gas flowing toward Sgr A* could be tightly packed and become tangled. These field lines may occasionally reconfigure themselves and produce a bright outburst of X-rays. These types of magnetic flares are seen on the sun, and the Sgr A* flares have similar patterns of intensity.

"The bottom line is the jury is still out on what's causing these giant flares from Sgr A*," said co-author Gabriele Ponti of the Max Planck Institute for Astrophysics in Garching, Germany. "Such rare and extreme events give us a unique chance to use a mere trickle of infalling matter to understand the physics of one of the most bizarre objects in our galaxy."

In addition to the giant flares, the G2 observing campaign with Chandra also collected more data on a magnetar: a neutron star with a strong magnetic field, located close to Sgr A*. This magnetar is undergoing a long X-ray outburst, and the Chandra data are allowing astronomers to better understand this unusual object.

NASA's Marshall Space Flight Center manages the Chandra program for NASA's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, controls Chandra's science and flight operations.

NASA is exploring our solar system and beyond to understand the universe and our place in it. The agency seeks to unravel the secrets of our universe, its origins and evolution, and search for life among the stars.

An interactive image, a podcast, and a video about the findings are available here.

For more Chandra images, multimedia and related materials, visit here.